**Proposed Item for Biobased Designation**

The following biobased product information has been collected to support item designation by USDA for the BioPreferred Program. This summary reflects data available as of December 3, 2007.

**Title:** Thermal Shipping Containers - Durable

**Description:** Insulated containers designed for shipping temperature-sensitive materials. These are thermal shipping containers that are designed to be reused over an extended period of time.

**Title:** Thermal Shipping Containers – Non-Durable

**Description:** Insulated containers designed for shipping temperature-sensitive materials. These are thermal shipping containers that are designed to be used once.

**Companies Supplying Item:** 2 company supplying Thermal Shipping Containers have been identified through internet searches, manufacturer's directories, trade associations, and company submissions.

**Industry Associations Investigated:** The following industry associations have been investigated for member companies supplying Thermal Shipping Containers:

- United Soybean Board
- American Soybean Association
- Polyurethane Foam Association
- Thermal Insulation Manufacturers and Suppliers Associations
- AC&R Insulation Associations
- North American Insulation Manufacturers Association
- National Insulation Association

**Commercially Available Products Identified:** Of the companies identified, 3 Thermal Shipping Containers are commercially available on the market.

**Product Information Collected:** Specific product information including company contact, intended use, biobased content, and performance characteristics have been collected on 3 Thermal Shipping Containers.

**Industry Performance Standards:** Product information submitted by biobased manufacturers and suppliers indicate that have typically been tested to the following industry standards:

- ASTM International #D4236 Standard Practice for Labeling Art Materials for Chronic Health Hazards
- ASTM International #D963 Specification for Copper Phthalcoyanine Blue Pigment

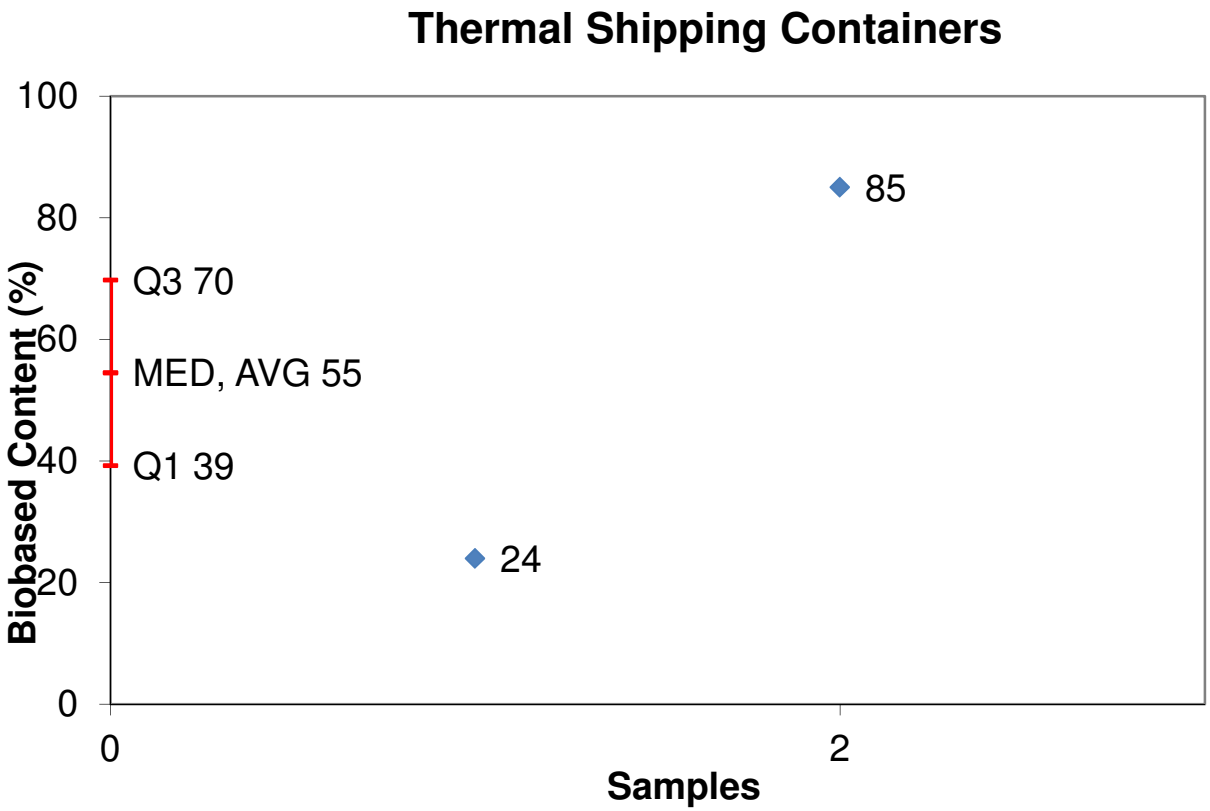
**Samples Tested for Biobased Content:** 2 samples of Thermal Shipping Containers have been submitted to independent laboratories for biobased content testing as specified by ASTM standard D6866-04.

**Biobased Content Data:** Results from biobased content testing of Thermal Shipping Containers indicate a range of content percentages from 24% minimum to 85% maximum biobased content as defined by ASTM D 6866-04. A detailed distribution of biobased content levels is included as Appendix A.

**Products Submitted for BEES Analysis:** Life-cycle cost and environmental effect data for 2 Thermal Shipping Containers have been submitted to NIST for BEES analysis.

**BEES Analysis:** The life-cycle costs of the submitted Thermal Shipping Containers range from 17.16 minimum to 18.75 maximum per usage unit. The environmental scores range from 0.0509 minimum to 0.0530 maximum. A detailed summary of the BEES results is included as Appendix B.

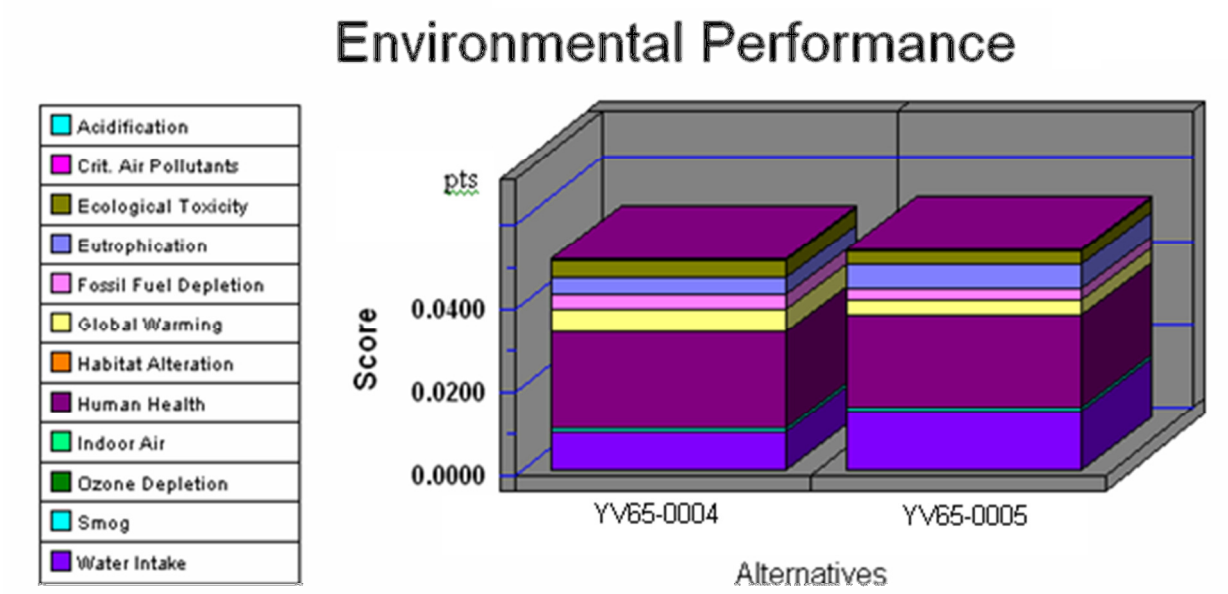
**Appendix A - Biobased Content Data**




| | Company | Product | C14 | BEES |
|---|---|---|---|---|
| 1 | YV65 | YV65-0004 | 24 | Yes |
| 2 | Q93N | Q93N-0002 | 85 | |
| 3 | YV65 | YV65-0005 | | Yes |

**Appendix B - BEES Analysis Results**

Functional Unit: 1 Container



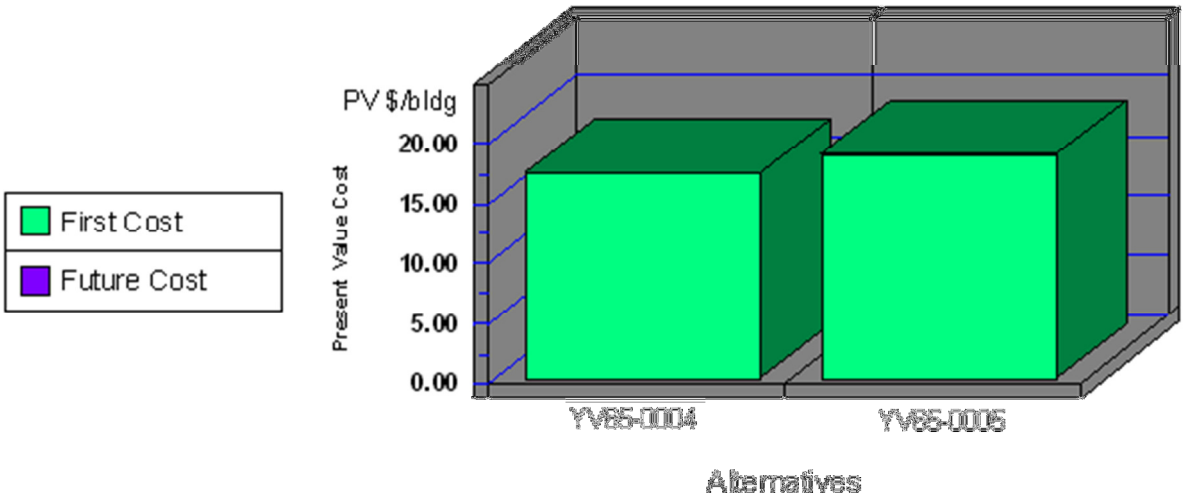

**Note: Lower values are better**

| Category | YV65-0004 | YV65-0005 |
|---|---|---|
| Acidification--3% | 0.0000 | 0.0000 |
| Crit. Air Pollutants--0% | 0.0005 | 0.0004 |
| Ecolog. Toxicity--7% | 0.0040 | 0.0031 |
| Eutrophication--8% | 0.0042 | 0.0060 |
| Fossil Fuel Depl.--10% | 0.0036 | 0.0025 |
| Global Warming--28% | 0.0057 | 0.0040 |
| Habitat Alteration--8% | 0.0000 | 0.0000 |
| Human Health--13% | 0.0229 | 0.0229 |
| Indoor Air--3% | 0.0000 | 0.0000 |
| Ozone Depletion--2% | 0.0000 | 0.0000 |
| Smog--4% | 0.0039 | 0.0039 |
| Water Intake--8% | 0.0062 | 0.0141 |
| Sum | 0.0509 | 0.0530 |

| Thermal Shipping Containers | | | |
|---|---|---|---|
| Impacts | Units | YV65-0004 | YV65-0005 |
| Acidification | millimoles $H^+$ equivalents | 3.49E+03 | 3.15E+03 |
| Criteria Air Polutants | microDALYs | 1.05E+00 | 8.61E-01 |
| Ecotoxicity | g 2,4-D equivalents | 4.70E+01 | 3.59E+01 |
| Eutrophication | g N equivalents | 1.34E+01 | 1.92E+01 |
| Fossil Fuel Depletion | MJ surplus energy | 1.24E+01 | 8.86E+00 |
| Global Warming | g $CO_2$ equivalents | 5.03E+03 | 3.51E+03 |
| Habitat Alteration | T&E count | 0.00E+00 | 0.00E+00 |
| Human Health--Cancer | g $C_6H_6$ equivalents | 1.45E+01 | 1.39E+01 |
| Human Health--NonCancer | g $C_7H_8$ equivalents | 2.28E+04 | 2.10E+04 |
| Indoor Air Quality | g TVOCs | 0.00E+00 | 0.00E+00 |
| Ozone Depletion | g CFC-11 equivalents | 2.17E-04 | 2.16E-04 |
| Smog | g $NO_x$ equivalents | 3.40E+01 | 3.49E+01 |
| Water Intake | liters of water | 6.08E+02 | 9.32E+02 |
| Functional Unit | ---------- | 1 Container | |

1 Following are more complete descriptions of units: Acidification: millimoles of hydrogen ion equivalents; Criteria Air Pollutants: micro Disability-Adjusted Life Years; Ecological Toxicity: grams of 2,4-dichlorophenoxy-acetic acid equivalents; Eutrophication: grams of nitrogen equivalents; Fossil Fuel Depletion: megajoules of surplus energy; Global Warming: grams of carbon dioxide equivalents; Habitat Alteration: threatened and endangered species count; Human Health-Cancer: grams of benzene equivalents; Human Health-NonCancer: grams of toluene equivalents; Indoor Air Quality: grams of Total Volatile Organic Compounds; Ozone Depletion: grams of chloroflourocarbon-11 equivalents; Smog: grams of nitrogen oxide equivalents; and Water Intake: liters of water.

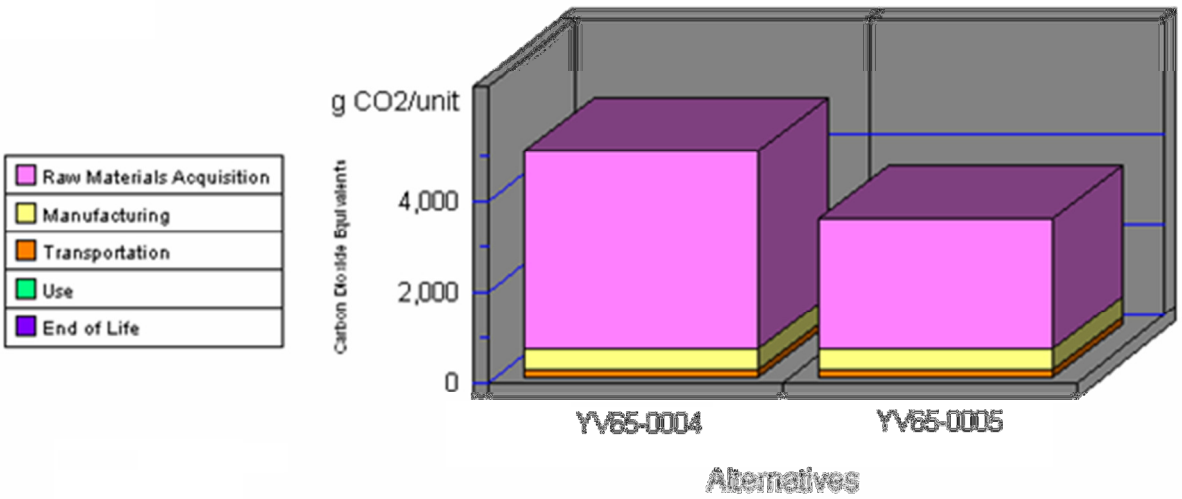
# Economic Performance




| Category | YV65-0004 | YV65-0005 |
|---|---|---|
| First Cost | 17.16 | 18.75 |
| Future Cost– 3.0% | 0.00 | 0.00 |
| **Sum** | 17.16 | 18.75 |

*This is a consumable product. Therefore, future costs are not calculated.

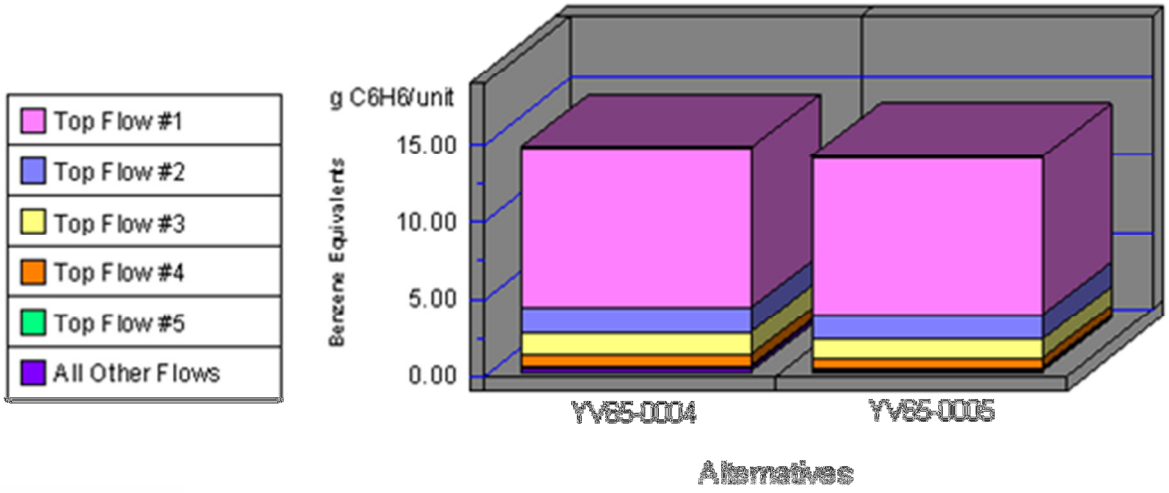
# Global Warming by Life-Cycle Stage




Note: Lower values are better

| Category | YV65-0004 | YV65-0005 |
|---|---|---|
| 1. Raw Materials | 4375 | 2861 |
| 2. Manufacturing | 466 | 466 |
| 3. Transportation | 187 | 187 |
| 4. Use | 0 | 0 |
| 5. End of Life | 0 | 0 |
| Sum | 5027 | 3513 |

## Human Health Cancer by Sorted Flows*

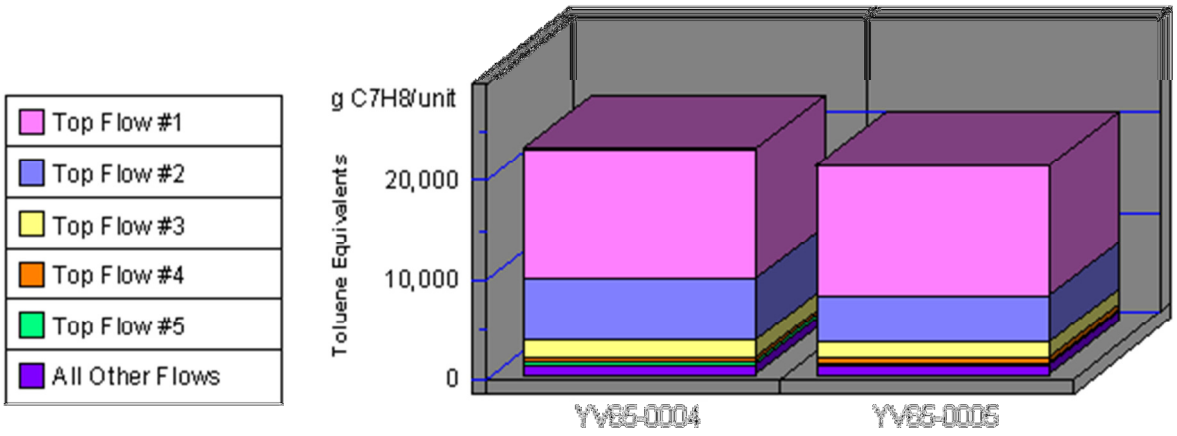



**Note: Lower values are better**

| Category | YV65-0004 | YV65-0005 |
|---|---|---|
| Cancer--(a) Dioxins (unspecific | 10.39 | 10.32 |
| Cancer--(w) Arsenic (As3+, As5+ | 1.59 | 1.50 |
| Cancer--(w) Phenol (C6H5OH) | 1.44 | 1.18 |
| Cancer--(a) Arsenic (As) | 0.72 | 0.84 |
| Cancer--(a) Carbon Tetrachlorid | 0.13 | 0.13 |
| All Others | 0.28 | 0.17 |
| Sum | 14.52 | 13.94 |

*Sorted by five topmost flows for worst-scoring product

## Human Health Noncancer by Sorted Flows*




Alternatives

**Note: Lower values are better**

| Category | YV65-0004 | YV65-0005 |
|---|---|---|
| Noncancer-(a) Dioxins (unspeci | 13,083.94 | 13,007.49 |
| Noncancer-(a) Mercury (Hg) | 6,278.76 | 4,686.66 |
| Noncancer-(a) Lead (Pb) | 1,625.63 | 1,533.72 |
| Noncancer-(w) Barium (Ba++) | 477.75 | 430.33 |
| Noncancer-(w) Lead (Pb++, Pb4+ | 325.91 | 288.17 |
| All Others | 1,014.60 | 1,013.03 |
| Sum | 22,804.60 | 20,959.60 |

*Sorted by five topmost flows for worst-scoring product